



A. The extent to which the agency has met the percentage goal it established for reducing its usage of electricity, gasoline, and natural gas:

- Energy consumption per gross square foot has been reduced by 47% (364 mBtu per GSF to 192 mBtu per GSF) over a fifteen-year period from FY02 – FY17. The revised goal in the Energy Action Plan 2020 is to achieve an Energy Use Intensity (EUI) of 180 by FY2020.
- Total real energy consumption has decreased 27 percent over this same fifteen-year period, from 6.74 trillion Btu in FY02 to 5.0 trillion Btu in FY17, while the space served grew by 46 percent, from 18.5 million GSF to 27.1 million GSF.
- Energy consumption reduction measures over this same fifteen-year period (FY02 – FY17) have generated \$225 million in avoided cost. Texas A&M University has provided exemplary leadership in the area of energy efficiency improvement and conservation with these accomplishments. (see attached “EUI Chart”)

B. The steps the agency may take to increase the percentage goal for reducing its usage of electricity, gasoline, and natural gas:

- The University has established and actively manages an Energy Action Plan (EAP) 2020 which targets further reduction of energy consumption per gross square foot over five years - from FY15 through FY20. The goal of EAP 2020 is to reduce the overall campus EUI from the FY15 baseline of 208 mBtu/GSF to 180 mBtu/ GSF by the end of FY20, or a reduction of 14% per GSF over 5 years. (see attached “EUI Chart”)
- In January 2012, the University completed a \$15 million energy efficiency projects (phases 1 & 2) with Siemens acting as the Energy Services Company (ESCO) that included consumption reduction measures in 18 buildings and 5 parking garages. These efficiency improvements in the facilities included lighting upgrades, building automations system retrofits, and HVAC system improvements. The first year (FY12) energy consumption reductions in the buildings far exceeded the guarantee for avoidance by 173% for electricity, 182% for chilled water and 145% for heating hot water and similar results have been seen in FY13.
- In February, 2015, the University completed Phase 3 of the SECO loan projects for an additional \$4.1 million in HVAC and lighting improvements in 10 buildings with a total of 802,000 GSF. This project is anticipated to avoid 5 million kWh of electricity, over 30,000 mmBtu of chilled water and almost 10,000 mmBtu of heating hot water.
- In March, 2017, the University completed Phases 4 and 5 valued at approximately \$11.3 million in HVAC, hydronic pumping and lighting improvements in 22 buildings and replacement of almost 2,710 exterior lights with LED replacement. These projects have an estimated energy avoidance of 7.5 million kWh of electricity, 20,792 mmBtu of chilled water and 8,267 mmBtu of heating hot water.



- The campus has a pilot program called Energy Performance Improvement program. The goal of the project is to close the gap between occupant expectations and the desire to conserve energy. Even with the Energy Stewardship program, UES knew there was more opportunity to reduce energy consumption. The program incentivizes the occupants to conserve and engage on a level like never before. The program starts with getting 'buy-in' from the leadership that occupies the building along with an agreement to share 75% of the cost avoidance as part of the pilot. The next step is to invite all the occupants to a meeting to have an open dialogue about the building's energy consumption / cost and to begin the brainstorming process. In addition, this provides the opportunity to discuss measures that Utilities & Energy Services would like to implement and get the occupants feedback. In the past, measures have been implemented and possibly not communicated to all researchers, faculty and other staff. This sets up an unhealthy relationship and makes the occupants skeptical about the results and the potential impact on their mission. With the new framework, all items are discussed and any changes are monitored to ensure no negative impacts results.
- A Utilities & Energy Services Capital Plan was completed in 2012, which documented and justified \$46 million in production and major infrastructure improvements that are required over the next five years. These projects were placed on the University Capital Plan for the period of FY13 – FY17. The Texas A&M Board of Regents has approved design and construction on all phases of capital improvements. The FY13 utility production upgrade project had a \$15.4 million budget and increases capacity for a growing campus, replaced aging equipment, and generates \$1.25 million annually in cost avoidance through improved operating efficiency. The FY14 project had a \$20.2 million budget and upgraded campus production facilities to meet the growing demands of the campus while cost avoiding over \$1 million annually. The FY15 project had a \$7.4 million budget that rounded out the production capacity and efficiency improvements.

The scope of capital upgrades that are **completed** include:

- Replacement of Chiller 103 @ SUP1
- Replacement of Chiller 07 @ CUP
- Addition of Heat Recovery Chiller 207 @ SUP2
- CUP & SUP1 Cooling Tower Upgrades
- Chilled Water Production Optimization @ CUP, SUP1, SUP2 & SUP3
- Installation of Chiller 206 @ SUP2
- Installation of Thermal Energy Storage @ SUP2
- Replacement of Chiller 10 @ CUP
- Replacement of Chillers 301 & 302 @ SUP3
- Cooling Tower Upgrade @ SUP3
- Addition of a Heating Hot Water Capacity @ SUP1
- Refurbishment of Chiller 8 & 9 @ CUP
- Cooling Tower Upgrade @ SUP2
- Replacement of Chiller 201 @ SUP2



- The campus is currently completing an update to the Utilities and Energy Master Plan which will include a focus on production equipment efficiency and capacity upgrades, a thorough review of the campus steam system to include efficiency and effectiveness and a look at the demand side reduction capabilities in the buildings. The campus has over 1,600 fume hoods and the Master Plan will look at best practices at other campuses or research facilities and make recommendations on how to leverage current best practices. The plan will also focus on ensuring that the Building Automation Systems (BAS) in the campus buildings are up to date. There are some buildings on campus in which the BAS panels are older and no longer available, this project will capture that information and document the cost to modernize. This modernization will lead to better control and a more efficient building.

C. Any additional ideas the agency has for reducing energy expenditures relating to facilities:

- The University continues to focus its Energy Stewardship team and other resources on Top 50 campus buildings, which consume 50% of the campus energy. This strategy will continue to allow a more detailed focus on identifying and correcting the issues to reduce overall energy consumption. While the other buildings will still be carefully managed, this more focused approach will lead to improved performance on a campus that exceeds 24 million GSF.
- In FY16, the University went operational with a chilled water optimization program. This program greatly reduces the pumping energy required by the campus by carefully monitoring the building loads and only moving the water when as required to meet load. With chilled water loops that exceed one million gallons, this will lead to significant energy savings.
- In addition to identifying opportunities to improve operating efficiency of building HVAC, BAS, and lighting systems, UES is evaluating opportunities to more precisely regulate the face velocity associated with over 1,000 fume hoods located on the Texas A&M University campus – to ensure safe operation with improved energy efficiency.
- The University targeted energy awareness in FY17 by developing an Energy Performance Improvement Pilot Program designed to achieve greater buy-in through increased engagement to generate more awareness and support at the individual and department levels. It is our belief that as customers and occupants understand how much it costs to operate their building, engagement and support for conservation and efficiency improvement efforts will be stronger.
- The University uses the EnergyCAP program to track all utility cost by building, by utility, and by customer across the College Station campus. In addition, the campus uses the Schneider PME system to make data from all meters across the campus available in real-time to provide feedback to technicians when making efficiency improvements.



D. Any additional ideas the agency has to minimize fuel usage in all vehicles and equipment used by the agency.

The following procedures have been and still are in place:

- Reduced bus routes – focus on efficiencies
- Reduced fleet vehicles – retiring older, less efficient vehicles
- Photocell lighting used on exterior of all garages
- Conservation tips have been posted on our website
- A brochure has been produced regarding fuel conservation
- We continue to communicate our efforts with Communication Representative from EAP 2020 Advisory Committee and offer assistance where needed with University-wide conservation efforts
- Contracted with Alta Inc. to develop a comprehensive bike plan to encourage alternative transportation.
- Established an agreement with Zipcar to provide car share at various locations on campus to reduce vehicular traffic.
- New technology provides guidance in our facilities to available spaces. This will be implemented in our new Cain Garage. It reduces circulation and emissions by getting vehicles in place faster and more efficiently.
- Converted most parking lot lighting around campus to LED lighting.
- Aggie Spirit provides over 7.6 rides annually, reducing vehicular traffic on campus.

University Fleet Fuel Consumption (provided by Transportation Services)

University Fleet		FY16	FY17	Reduction / Increase	
Fuel Type	Units			%	Actual
Diesel	Gallons	606,402	633,589	4%	27,187
Gasoline	Gallons	319,987	321,695	1%	1,708
Propane	MMBTU	678	868	22%	190



Energy Use Intensity (Energy Consumption per GSF)

Texas A&M University, College Station, Texas

